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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,645	09/22/2003	Paul D. Beattie	12913US03	1118

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EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/667,645

Applicant(s)

BEATTIE ET AL.

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/20/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities: the first paragraph of the specification recites “now U.S. Patent No. 6,\_\_\_\_,\_\_\_\_ issued \_\_\_\_\_,”. The specification should be amended to recite the patent number and issue date (6,667,127 and 12/23/03).

Appropriate correction is required.

### ***Claims Analysis***

The phrase “suitable for use in a fuel cell electrode” in claim 1 is not given patentable weight because it is an intended use limitation.

The phrase “suitable for use in a solid polymer electrolyte fuel cell” in claim 4 is not given patentable weight because it is an intended use limitation.

The phrase “for use in a fuel cell electrode” in claims 13 and 21 is not given patentable weight because it is an intended use limitation.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7, 11, 12, 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites “greater than about 50% porous”, which is indefinite. It is unclear if the claim encompasses, for example, 49.5% porosity because 49.5% is “about” 50%, but not “greater than” 50%. Examiner suggests the phrase “greater than or about”.

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Claim 11 is similarly rejected because of the phrase "greater than about".

Claim 12 is similarly rejection because of the phrase "less than about". Examiner suggests the phrase "less than or about 20 seconds".

The term "mostly uniformly distributed" in claim 15 is a relative term which renders the claim indefinite. The term "mostly uniformly distributed" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what constitutes "mostly uniformly distributed".

The term "mostly disposed" in claim 16 is a relative term which renders the claim indefinite. The term "mostly disposed" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what "mostly disposed" encompasses.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 and 13-24 are rejected under 35 U.S.C. 102(b)/35 U.S.C. 103(a) as being anticipated by, and alternatively unpatentable over, Miwa et al., US 4,851,304.

Miwa teaches an electrode substrate for a fuel cell comprising carbonized resin. The substrate has pores (fluid diffusion) and a porosity of 60-80%. Chopped carbon fibers are dispersed in random directions within a substantially 2-dimensional plate and bound together with an organic binder to make a carbon fiber mat (web). The carbon fiber mat is impregnated with a resin to make a prepreg and hot pressed. The press molded product is carbonized by heat treatment under a temperature of 1300-3000°C (abstract). The electrode substrate is gas permeable (3:1-4). The carbonized resin bonds the carbon fibers together (3:15-26). Figures 1 and 2 show catalyst layers 11b and 12b applied to the electrode substrate layers 11a and 11b, respectively. Two sheets of the prepreg comprising different materials/structures may be superposed on one another (plurality of webs) (19:18-45). The electrode substrate is impregnated with a carbonized product of the resin. The resin is carbonized to become carbon or graphite (10:24-29).

Regarding claim 6, the specification teaches the binder may be any suitable material, even the carbonizable polymer having pyrrolidone functionality (0030). Therefore, the “binder” and the “carbonization product” of the claimed invention are not distinguishable because they are the same material.

Thus the claims are anticipated.

The claims are alternatively unpatentable. Miwa does not explicitly state the impregnating polymer that is carbonized has pyrrolidone functionality. However, this is

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considered a product-by-process limitation because the end product is the same. Regardless of the resin/polymer used, when carbonization occurs only carbon remains. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious.

\*

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miwa et al., US 4,851,304.

Miwa teaches an electrode substrate for a fuel cell comprising carbonized resin. The substrate has pores (fluid diffusion) and a porosity of 60-80%. Chopped carbon fibers are dispersed in random directions within a substantially 2-dimensional plate and bound together with an organic binder to make a carbon fiber mat (web). The carbon fiber mat is impregnated with a resin to make a prepreg and hot pressed. The press molded product is carbonized by heat treatment under a temperature of 1300-3000°C (abstract). The electrode substrate is gas permeable (3:1-4). The carbonized resin bonds the carbon fibers together (3:15-26). Figures 1 and 2 show catalyst layers 11b and 12b applied to the electrode substrate layers 11a and 11b, respectively. Two sheets of the prepreg comprising different materials/structures may be superposed on one another (plurality of webs) (19:18-45).

Miwa does not explicitly state the Taber stiffness value or electroconductivity of the electrode substrate.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Miwa teaches the percentages of the resins may be varied to control the electroconductivity and the stiffness of the electrode substrate (8:25-38). Miwa teaches the resin cannot become sufficiently stiff if a large amount of resin is used.

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One of skill in the art would have been motivated to provide an electrode substrate with the claimed stiffness value because Miwa teaches the electrode substrate should be sufficiently stiff. Miwa teaches how to vary the stiffness of the electrode substrate. Furthermore, Miwa teaches the electroconductivity of the resin is not improved sufficiently if a minimal amount of resin is used. One of skill in the art would have been motivated to provide an electrode substrate with the claimed electroconductivity because Miwa teaches the electrode substrate has improved electroconductivity (abstract).

Miwa does not explicitly state the air permeability of the electrode substrate.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Miwa teaches the electrode substrate is excellent in gas permeability (abstract). Miwa teaches gas permeability of the electrode substrate is given by the porous property of the electrode substrate (porosity, pore size) (1:28-32). Miwa teaches the diameter (size) of the carbon fibers affects mean pore size and gas permeability of the substrate (5:54-6:30). One of skill in the art would have been motivated to provide an electrode substrate with the claimed gas permeability because Miwa teaches the electrode substrate is excellent in gas permeability. Miwa teaches how to vary the gas permeability of the electrode substrate.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Tracy Dove', with a stylized, flowing script.

Tracy Dove  
Patent Examiner  
Technology Center 1700  
Art Unit 1745

March 3, 2005